

Abstract

A phase-locked loop system, including a voltage controlled oscillator coupled with an error detector in a feedback configuration, so as to produce an output signal having a desired characteristic that is based on a reference signal. The system also includes a charge pump system coupled with the voltage controlled oscillator and configured to produce currents to control phase and frequency of the output signal. The charge pump system includes at least two charge pumps, one being configured to effect more rapid changes in the output signal than the other. This charge pump may be configured to deliver a higher charge pump current than the other charge pump, and/or may be activated intermittently upon detection of cycle slippage or another condition detectable during operation of the phase-locked loop system.